



State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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TO: Internal File

FROM: Michael Suflita, Reclamation Hydrologist *MS*

RE: Wild Horse Ridge Significant Revision, Co-Op Mining Company, Bear Canyon Mine, ACT/015/025-SR98(1)-3.

SUMMARY:

C. W. Mining proposes to add leases, east of the Bear Canyon Fault, to its existing permit area. The proposal includes new surface facilities in the Bear Canyon Right Fork.

In general, some inconsistencies make the application unclear and some information is lacking. Information related to operational water monitoring need more description. The permit application should be corrected prior to approval.

TECHNICAL ANALYSIS:

ENVIRONMENTAL RESOURCE INFORMATION

CLIMATOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.18; R645-301-724.

Analysis:

The Mayo and Associates PHC, August 1999 incorporates current climatic information into the plan. Average annual precipitations are recorded between 10 and 15 inches from lower elevation gauging stations within the permit and adjacent area. Average annual precipitation is recorded as 29 and 33 inches in the high elevation gauging stations. The Palmer Hydrologic Drought Index for Utah Division 4 and Division 5 climatic regions are presented and discussed.

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Findings:

The application meets the minimum requirements for this section.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Analysis:

Sampling and analysis

Holding time and sample analysis problems occurred at sites 16-7-13-1, 16-18-14 and 16-8-20-1. See Tables 2b and 3 in this TA. For surface water site WHR-1, fluoride was not distilled for baseline data on June and August 1993; however, fluoride is no longer considered a required baseline parameter. Holding time expired on Sulfate on 10/93. For all samples dissolved metals, which were filtered at lab, were received within one day. Lab sheets for all sites where data was collected on July 1991 were missing from the amendment since they could not be found. However, the data had been recorded and was submitted.

Baseline information

Appendix 7-M, Spring and Seep inventory Federal Lease Area, provides a discussion of the seeps, springs, and streams in and adjacent to the Wild Horse Ridge addition. Attachment 7M-A, Surface and Groundwater Water Quality Information provides the lab sheets for baseline monitoring. Table 7.1-8, Water Monitoring Matrix: Operational Phase of Mining lists the proposed monitoring plan for the mine which now includes the new addition. The surface and ground water parameters monitored remain the same as in the original Mining and Reclamation Plan. The plan needs to clearly state that the operational monitoring will continue through reclamation to bond release. Also, considerable clarity will be achieved by dividing the monitoring points into wells, springs, and streams. This would be consistent with the PHC, which is formatted in this manner, and is standard practice for coal mines that the Division regulates.

Although included, adjacent area sampling associated with the Mc Cadden Hollow area were not reviewed. This information was not considered to be directly related to the proposed Wild Horse permit area, but will be considered applicable to the Cumulative Impact Area (CIA) information.

Ground-water information

Numerous sources for ground water related information is found throughout the plan. The baseline information relative to groundwater, seeps, and springs in the proposed Wild Horse

Ridge permit are presented in Tables 1, 2 and, 2b in this TA. Data for groundwater well information, identified in Table 1, were collected in 1996 and 1997.

Table-1: Wild Horse Ridge Monitoring Wells*

Well Number	Formation Monitored & Relative Location	Screen Intervals	General Observations
MW-114	Spring Canyon Sandstone - East of the Bear Canyon Fault.	Upper screen interval 1795-1805 ft. Lower screen interval 1819-1829 ft.	Water elevation measured on 8/22/96, 09-24-96 and 10-23-97 varied from 7649.5 to 7650.5 feet. Potentiometric water level - approximately 26 ft below Hiawatha Seam.
MW-116	Spring Canyon - East of the Bear Canyon Fault	Upper screen interval 1720-1730 ft. Lower screen interval 1743.3-1753.3 ft.	Water elevation measured on 10/18/95, 7/19/96, 09/24/96 and 10/23/97 varied from 7743.9 to 7744.5 feet. Potentiometric water level - approximately 71.2 ft below Hiawatha Seam.
MW-117	Spring Canyon - near fault line - East of the Bear Canyon Fault Section 12, T. 16 S. R. 7 E.	Upper screen interval 1720-1730 ft. Lower screen interval 1743.3-1759.7 ft.	At 1720 ft. fault gouge and fractured material encountered. Caving continued with out a defined Star Point Formation. Water elevation measured on 10/18/95, 07/19/96, 9/24/96 and 10/23/97 varied from 7746.2 to 7746.5 feet. Hiawatha Seam not identified on log.

*Data obtained from Cyprus-Mohrland Project Drill Report.

The Wells MW-114 and 117 will be monitored for water level prior to mining the Wild Horse Ridge to verify the existing water elevations recorded at these wells are the same as the elevations obtained during 1996 and 1997. This way, should mining in the Wild Horse Ridge intercept water from a sand channel or other significant in mine flow, the pre-mining status at these wells will not be in question. Water age dating and chemical make-up with stiff diagrams should also be conducted to verify the information found west of the Bear Canyon Fault can be applied to the Star Point Sandstone Formation east of the Fault. This was brought out in the previous Technical Analysis.

Plates 6-2 through 6-12 also show locations for WHR-1, WHR-2, WHR-3, WHR-5, and WHR-8. These five drill-holes fall within the adjacent area and the Cumulative Impact Area (CIA). The notation for springs and drill logs are the same and this can be confusing.

Spring Data

Spring sampling was conducted for the Wild Horse Ridge lease addition and adjacent area as summarized in Table 2 below. Information on springs within and adjacent to the Wild Horse Ridge area include springs WHR-2, WHR-3 and WHR-4. Spring WHR-4A was included

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in the Probable Hydrologic Consequence document and on a map, but there was no flow recorded for that location (Figure 1, Mayo and Associate Report, August 1999). Spring identification labels have been clarified by providing both labels on Plate 7-4, Water Monitoring and a cross reference table is included in Appendix B of the Mayo and Associates Report. In addition, Table 1 includes a legend of geologic formation abbreviations, and Figure 15 includes the geologic structure for the various stiff diagrams.

Table 2: Baseline Spring Sampling Wild Horse Ridge Mayo Report

Site/Location	No. Data Samples sampling period	Geology	Flow rate (gpm) Min/Max
WHR-2 Fish Creek LF-East	7 7/31/91 - 8/30/94	Tf-TKnh	0.2/20
WHR-3 Head Fish Creek	8 7/30/91 - 10/31/94	Tf	0.5/70
WHR-4/SBC-13/SBC-16 Fish Creek LF-West	8 7/30/91 - 10/31/94	Tf-TKnh	0/65
WHR-5/SBC-15 Bear Canyon RF (above coal outcrop)	8 7/31/91 - 10/30/94	Tf-TKnh	0.0/17
WHR-6/SBC-14 Bear Canyon RF (near disturbed area)	8 10/26/93 - 6/24/97	Kbh	0.5/15
WHR-7 Fish Creek LF- West	1 7/30/91	Kbh	40
WHR-8 Wild Horse Ridge	1 7/31/91	Kbh	5
16-7-24-3 Bear Canyon Cliff Face	1 3/17/99	Kbh	no flow reported- chemical analysis obtained
16-7-24-4/SBC-17 Bear Canyon Fault	1 3/17/99	Kbh	no flow reported- chemical analysis obtained

Tf- Flagstaff Formation

TF-TKnh- at the contact between the Flagstaff and North Horn Formation

Kbh-Black Hawk Formation

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Table 2b: Baseline Spring Sampling Wild Horse Ridge

Site/Location	Date				Comments
	1st Q	2nd Q	3rd Q	4th Q	
WHR-2 1991 1992 1993 1994 1997			7/31/91	10/28/92	Left Fork Fish Creek east side dry 10/31/94
		6/24/93	8/15/93	10/13/93	
		5/30/94	8/30/94	10/31/94	
		6/25/97	9/10/97	10/20/97	
WHR-3 1991 1992 1993 1994 1997			7/30/91	10/27/92	Head waters of Fish Creek Fluoride not distilled 10/92, 6/93, 8/93. Holding time expired on Ortho Phosphate 10/13/93. Dissolved metals filtered at lab received within a day. Sample > 6 deg C on 10/94.
		6/24/93	8/15/93	10/13/93	
		5/30/94	8/30/94	10/31/94	
		6/25/97	9/10/97	10/20/97	
WHR-4 1991 1992 1993 1994 1997			7/30/91	10/28/92	Left Fork Fish Creek west side. 03/93, 03/94 not accessible. Fluoride not distilled 10/92, 6/93, 8/93. Holding time expired on Ortho Phosphate 10/13/93. Dissolved metals filtered at lab received within a day. Sample > 6 deg C on 10/94.
	03/22/93	6/24/93	8/15/93	10/13/93	
	03/30/94	5/30/94	8/29/94	10/31/94	
		6/24/97	9/10/97		
WHR-5 1991 1992 1993 1994 1997			7/30/91	10/28/92	Right Fork - Left Fork Bear Canyon 03/93, 03/94 not accessible. Fluoride not distilled 10/92, 6/93, 8/93. Holding time expired on Ortho Phosphate 10/13/93. Dissolved metals filtered at lab received within a day. Sample > 6 deg C, on 10/94.
		6/24/93	8/15/93	10/13/93	
		5/30/94	8/29/94	10/31/94	
		6/24/97	9/10/97	10/20/97	
WHR-6 1993 1994 1995 1997	3/23/94	6/01/94 5/24/95 6/24/97	8/28/94 8/22/95 09/18/97	10/26/93 10/26/94 10/28/97	Right Fork - Right Fork Bear Canyon 03/94 not accessible. Holding time expired on Sulfate 10/93. Possible matrix interference with Cl-6/94. Possible matrix interference with Nitrite- 10/94. Possible matrix interference with Selenium- 5/95. Dissolved metals filtered at lab received within a day. Sample > 6 deg C, on 8/95.

The Mayo Report discusses spring discharge rates by formation using a calculated R-value which is the sum of the minimum flows, over the sum of the maximum flows for all

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springs issuing from the formation. This analysis provides a generalized description for the formation while individual r-values for springs within the formation may vary from the generalized description. Data used for the springs do not have a continuous record; therefore, high and low flow data is not represented for each year within the period of record (1991 to 1999). The climate, from 1991 to 1999, consisted of the end of a 4 year long dry spell, moving into short periods of moderately to severely wet climate disrupted by intermittent dry periods (Region 4 and 5 drought index). Some data used in the analysis may be influenced by historic mining activities. Although the Mayo Report states that Figure 6a and 6b represent the maximum and minimum discharge rates from each formation, the data record is not continuous enough to support this statement. However, the general high and low flow pattern for these formations is probably representative.

Surface-water information

The Mayo Report identifies Trail Creek, Bear Creek, Fish Creek and Lower Cedar Creek as perennial. The upper Trail Creek, Mc Cadden Hollow, Blind Canyon, and Upper Cedar Creek are intermittent or ephemeral.

Baseflow to Lower Trail Creek was attributed to be sustained by flow from springs in the area especially TS-1. Baseflow appears to be about 25 gpm for the period of record until mid 1995 where baseflow appears to increase. Baseflow to Bear Canyon Creek is estimated to be about 30 to 50 gpm and is attributed to be sustained from springs such as FBC-12, emerging from the North Horn Formation.

According to the PHC, Fish Creek is a perennial stream. During 1996 and 1997 low flow was 15 gpm in Fish Creek in both the Left and Right Forks. It's suspected that these drainages may become intermittent during periods of prolonged drought.

Baseline cumulative impact area information

Adjacent area information is included within this permit application package for areas where future mining is likely to occur.

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Table 3: Baseline Stream Sampling Wild Horse Ridge

Site/Location		Date				Site Flow Rates (gpm)	Comments
		1st Q	2 nd Q	3rd Q	4th Q		
CK-1 (not on Map)			06/94 06/95 07/96		10/94 10/95 10/96	Max 1104 Min 103 Average 666	Field data only. No sample date.
CK-2 (not on Map)			06/94 06/95 07/96		10/94 10/95 10/96	Max 950 Min 4 Average 241	Field data only. No sample date.
LF-1	1994 1995 1996		06/09/94	07/10/95 07/16/96	10/27/94 10/18/95 10/15/96	Max 266 Min 15 Average 68.5	
RF-1	1994 1995 1996		06/09/94	07/10/95 07/16/96	10/27/94 10/18/95 10/15/96	Max 191 Min 15 Average 66.5	
WHR-1	1991 1992 1993 1994 1997	03/29/93 03/23/94	06/24/93 06/01/94 06/29/97	07/31/91 08/15/93 08/29/94 09/17/97	10/28/92 10/26/93 10/30/94	Max 650 Min 0 Average 89.0	No access on 03/93. Dry 08/94. No flow recorded 10/28.

Modeling

Modeling is not proposed to be used instead of data acquisition.

Alternative water source information

No additional information on alternative water source information was presented in this amendment.

Probable hydrologic consequences determination

The probable hydrologic consequences determination is provided in Mayo and Associates, LC "Investigation of Groundwater and Surface - Water Systems in the C.W. Mining Company Federal Coal Leases and Fee Lands, Southern Gentry Mountain, Emery and Carbon Counties, Utah: Probable Hydrologic Consequences of Coal Mining in the Bear Canyon Mine Permit Area and Recommendations for Surface Water and Ground Water Monitoring" August 1999. Pertinent portions from this determination will be used to update the CHIA and complete technical directive process at Birch Spring and Big Bear Spring.

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Findings:

The application does not meet the minimum regulatory requirements for this section. The permit must be updated to meet the following:

R645-301-121.200. 1) The plan needs to clearly state that the operational monitoring will continue through reclamation to bond release. Also, considerable clarity needs to be achieved by dividing the monitoring points into wells, springs, and streams. This would be consistent with the PHC, which is formatted in this manner, and is standard practice for coal mines that the Division regulates. 2) Water age dating and chemical make-up with stiff diagrams should also be conducted to verify the information found west of the Bear Canyon Fault can be applied to the Star Point Sandstone Formation east of the Fault.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

Monitoring Sampling Location Maps

Plate 7-4, Water Monitoring, shows nearly all the monitoring locations proposed in Table 7.1-8, Water Monitoring Matrix, Operational Phase of Mining. Sites SBC-3 and MW-117 could not be shown due to the scale of the map, however, they are shown on Plate 7N-2, Water Sampling Locations.

Surface Water Resource Maps

Water rights have been updated on Plate 7-4. A check of the Utah Division of Water Rights Internet page shows the appropriate water rights have been shown on the map. It should be noted that the statement on page 3-42 is not correct. This indicates, "No state appropriated water exists within areas of the permit area which could be impacted by subsidence". Underground mining always has the potential to impact water supplies. Several water rights in and near the Wild Horse Ridge could possibly be affected by the mining. The intent of the monitoring program is to determine possible impacts. The statement needs to be eliminated or modified.

Findings:

The application does not meet the minimum regulatory requirements for this section. The permit must be updated to meet the following:

R645-301-742. 1) The statement on page 3-42 regarding no water rights could be impacted needs to be eliminated or modified.

OPERATION PLAN

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

Ground-water monitoring

The plan references a recommended water monitoring plan, included in Appendix 7-J, section 10.0. The proposed monitoring plan is contained in section 7.1.7.

One flow measurement was obtained at springs WHR-7 and WHR-8. No information was provided for WHR-9. The plan indicates that these springs will not be monitored because WHR-4 will represent these springs. Site WHR-7 was estimated to be approximately 400 ft above the Tank Seam while WHR-9 and WHR-8 are close to drill logs showing no coal.

The PHC, Appendix 7-J, includes a discussion in the subsidence section on multiple coal seam removal. Mining the Tank (upper) and Blind Canyon (lower) seams in other sections of permit area has seen cracking extend upward no more than 250 feet above the Blind Canyon Seam. The surface fractures extend down about 100 feet. Average overburden for the Tank Seam is 950 feet while for the Blind Canyon Seam it's 1200 feet. Total subsidence for the two seams has been calculated to be 7.3 feet. Reference Table 3C-1. However, springs having significant discharge within the Wild Horse Ridge area are separated from the Tank Seam by 1000 feet. Thus, the PHC states, the potential for mining to impact these springs appears to be minimal. Given the surface fracturing, the possibility exists that surface recharge to the springs could be affected, one way or the other.

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The PHC indicates it is unknown whether water may be encountered along the Bear Canyon Fault from the east, but that this water is suspected to have antiquity. The well closest the fault, MW-117, will be monitored in conjunction with MW-114, as these wells would most likely show effects if waters with antiquity do discharge to the fault should it be encountered during mining.

Surface-water monitoring

The Upper Right Fork Bear Creek, BC-4, above the proposed disturbed area, has been added to the monitoring plan. Surface water monitoring at the Left Fork of Fish Creek, FC-1 and McCadden Hollow, MH-1, were added to the monitoring plan.

Acid and toxic-forming materials

Information is contained in Appendix 6-C of the MRP. According to the PHC, strata in the proposed permit area is expected to be identical to the existing permit area. Acid from pyrite oxidation is readily consumed by dissolution of carbonate minerals available in the mine area.

Transfer of wells

No discussion on transfer of wells in the new permit area is provided. It is assumed all wells will be properly abandoned when no longer needed for mining.

Discharges into an underground mine

It was estimated that 0.05 cfs water will be required for mining associated with the Wild Horse Ridge. A Water line from #1 mine to the #3 and #4 mine is located along the conveyor. This water is to be used for a bath-house, drinking water and for spray; on the working face, at coal belt heads, at transfer points and at the tippie for dust suppression. Page 7-56 indicates, "No water will be discharged into the mine during or following reclamation".

Gravity discharges

No gravity discharges are expected for the Wild Horse Ridge mines, Bear Canyon No. 3 or No. 4 (reference page 7-56).

Water quality standards and effluent limitations

Water quality standards and effluent limitations must be conducted according to State Standards and the approved UPDES permit. A copy of the current permit, which includes a discharge point for Pond D is included in Appendix 7-B.

Diversions

Diversion designs are provided for the 10 year- 6 hour event. The applicant committed to maintain the minimum required cross sectional area. Freeboard was presented to be 0.30 ft to 0.48 ft. Standard engineering practices generally use a minimum of 0.3 ft so this is acceptable. Along the roads, additional culverted cross drains may be advantageous in meeting the ditch requirements without requiring changes in the road surface slope.

The culvert containing Bear Creek for the road to get to the new addition has been designed to meet the 100-year 6-hour storm. This is described in Appendix 7-G. This is the appropriate design storm.

Road Drainage

The applicant should consider placing a culvert at the approximate location of label D-21U on Plate 7-1 F. The primary road retains this drainage along the in slope for a significant distance in this region. Also, the slope breaks from a steep section to a low gradient area at this location which may result in maintenance problems due to sediment settling out in the ditch.

Stream buffer zones

The Division will need to grant approval for construction in a buffer zone. This will be completed when all deficiencies for the proposed mine application are addressed. Also, the approved Stream Alteration Permit from the State Division of Water Rights is needed to complete the stream buffer zone section of this Technical Analysis. The completed, although unapproved, Stream Alteration Permit is included in an unnamed appendix behind Appendix 7-M. This appendix needs to be numbered and named.

Sediment control measures

Construction - Sediment Control Methods

A berm will be created on the downslope side of a cut. Road cuts will be made into the slope rather than parallel to the slope. Blasts will be designed to drop material into the cut area behind the berm, pg. 30-3. The blasting methods used here will be the same as have proven successful in constructing the other roads in the permit area. Along the Blind Canyon Seam Portal Pad temporary and permanent silt fences will be placed to treat all runoff from the disturbed area not contained by a berm. Fences will remain in place until all runoff is directed to the sedimentation pond and erosion control matting will be used on the out slope of the Blind Canyon Seam Portal pad fill, pg. 30-5. Due to past problems with erosion control matting failures, the Division requires the Applicant to commit to install the matting in strict conformance with the manufacturers instructions.

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Discussions related to culvert placement and pad and operational construction in the drainages are detailed. The applicant states that, "Following initial pad contouring the sediment pond will be constructed followed by road crowning and ditch and culvert placement." pg. 3O-6. More construction detail is contained on pages 3O-2 through 5. Culverts will first be placed in the ephemeral drainages at each crossing to separate disturbed and undisturbed drainages in the event of storms during construction. Also, that way the catch basins will not receive runoff from undisturbed drainages. Special care is to be taken at a "small riparian area.....adjacent to this road". This is above the spring designated SBC-14, (WHR-6) which is a unique area. A site visit by the Division evaluation team followed by discussions with the Applicant resulted in an agreement that the Division Hydrologist will be notified in time to make a field visit when the blasting is to occur above this spring, SBC-14, (WHR-6) and when construction for the culvert above this spring is to take place. This will need to be added to the amendment.

Operational - Sediment Control Methods

Sediment control measures include using a sedimentation pond and BTCA erosion control areas "V" and "W". The BTCA area "V" includes the out slope along the conveyor access road and the Blind Canyon portal pad out slope area. These areas are mapped on Plate 7-1G. Erosion control matting will be used on the out slope and a berm will be placed on the outside edge to prevent water from flowing onto the slopes.

BTCA areas "W" include the conveyor belt areas. A silt fence will be placed down slope during construction and be evaluated for removal following construction. During operations, coal fines will be captured in a metal pan below the belt and will be cleaned off the pan. A dust cover will be placed over the belt to prevent fine coal wind transport. Details of the conveyor belt are presented in Figure 7K-1, Typical Conveyor Pan Structure. These appear to be reasonable measures to minimize the amount of coal fines leaving the conveyor belt.

In the lowest belt area, the pan will be cleaned with water draining to disturbed area ditch D-3D, which reports to the lower area sediment pond. The two upper conveyor belt areas will report to two catch basins, No. 1 and 2. The Wild Horse Ridge Coal Storage Bin area also reports to catch basin No. 2. These areas are mapped on Plates 7-1C, 7-1F and 7-1G. The designs, calculations and certification for these basins are provided in Appendix 7-K. Capacity was based on a 10 year 6hr storm peak. Catch basins will be inspected and cleaned as necessary to maintain capacity. Both of the catch basins have an outlet spillway, so flow from the basin is controlled under situations that exceed the storage volume. These are detailed in Figures 7K -3 and -4. However, spillways are required to be "of non-erodible construction" such as rock riprap. Such protection will need to be provided for both of the catch basin spillways.

Siltation structures

See: Sedimentation Ponds.

Sedimentation ponds

The proposed Wild Horse Ridge area includes designs for sedimentation pond 'D'. All runoff from the portal pad area will report to this pond. The pond was designed to the appropriate 10-year, 24-hour storm event using runoff curves of 90, which is appropriate for the pad area and rocky drainage area leading to the pond. The pond is designed to store the full volume of the design storm. Reference Table 7.2-15, and Plate 7-11.

The sedimentation pond must maintain adequate sediment storage capacity. The proposed clean out level of 60% meets this requirement. Reference Section 7.2.8.4 and Plate 7-11, Sediment Pond "D". At pond 'D', the decant structure is located above the 60% clean out level. The clean out elevation is 0.55 ft below the decant elevation. A Decant Structure Detail is included, however, it's unclear which end is in the pond and which end is at the outlet of the culvert under the portal area. This should be clearly labeled with the oil skimmer end in the pond.

A single open channel spillway is proposed for discharge from the pond. No controls for an oil skimmer are provided for the sedimentation pond should the runoff exceed the 10 year - 24 hour event. A fuel tank is located on the pad draining to this pond. No tank volume or discussion of the tank containment structure was found. Full containment berms around fuel tanks are standard on the rest of the site, and one should be included for this one. Since the runoff from this pond eventually makes it's way to Huntington Creek and fuel is used in this location, this does not provide adequate protection for fish and wildlife. An oil skimmer is must be provided on the Sediment Pond D outlet spillway. The spillway is one foot wide and one foot deep and a simple straight sheet of corrugated galvanized steel would provide an adequate oil skimmer. This would, of course, extend from well below the spillway invert to the top of the pond. Other configurations would also work and this is only a suggestion for the Applicant.

Based on the letter accompanying the latest submittal, it's expected that the SPCC plan will be updated and available at the site "within six months of implementation of the Wild Horse Ridge construction". A determination will then be made as to whether the proposed plan minimizes potential for hydrocarbons to be released off the permit area. This needs to be included in the plan.

Dames and Moore conducted a stability analysis for the Portal Staging Area sedimentation pond, July 23, 1999. This analysis for steady state seepage assumes a 7 foot deep pond is full and two seepage conditions exist: 1) A straight line condition through the fill, and 2) Seepage controlled by the native sandstone and colluvium interface. Results suggest during a pseudo-static loading condition, shallow surface slide and sloughing from the structural fill and native slopes could be expected with strong ground movement. Proposed embankments have a minimum safety factor of 1.46.

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Other treatment facilities

No "other treatment facilities" are proposed.

Exemptions for siltation structures

No exemption from siltation structures is proposed.

Discharge structures

Discharge structures are designed to minimize erosion.

Impoundments

See: Sedimentation Ponds.

Casing and sealing of wells

No changes to the casing and sealing of wells is proposed. The existing plan is assumed to be adequate to handle this regulatory requirement.

Findings:

The application does not meet the minimum regulatory requirements for this section. The permit must be updated to meet the following:

R645-301-731, (1) A site visit by the Division evaluation team followed by discussions with the Applicant resulted in an agreement that the Division Hydrologist will be notified in time to make a field visit when the blasting is to occur above this spring, SBC-14, (WHR-6) and when construction for the culvert above this spring is to take place. This will need to be added to the amendment. **(2)** Based on the letter accompanying the latest submittal, it's expected that the SPCC plan will be updated and available at the site "within six months of implementation of the Wild Horse Ridge construction". A determination will then be made as to whether the proposed plan minimizes potential for hydrocarbons to be released off the permit area. This needs to be included in the plan. **(3)** Due to past problems with erosion control matting failures, the Division requires the Applicant to commit to install the matting in strict conformance with the manufacturers instructions.

R645-301-742.223, Spillways are required to be "of non-erodible construction" such as rock riprap. Such protection will need to be provided for both of the catch basin spillways.

R645-301-512.240. Current prudent engineering practices need to be followed:

(1) An oil skimmer is must be provided on the Sediment Pond D outlet spillway. (2) Full containment berms around fuel tanks are standard on the rest of the site, and one should be included for this one, at the portal area.

R645-301-312.4, An approved Stream Alteration Permit obtained from the State Division of Water Rights for the proposed several stream channel alterations will need to be provided when it's received. This information is necessary to make buffer zone findings. The unnamed appendix behind Appendix 7-M needs to be numbered and named.

RECLAMATION PLAN

GENERAL REQUIREMENTS

Regulatory Reference: PL 95-87 Sec. 515 and 516; 30 CFR Sec. 784.13, 784.14, 784.15, 784.16, 784.17, 784.18, 784.19, 784.20, 784.21, 784.22, 784.23, 784.24, 784.25, 784.26; R645-301-231, -301-233, -301-322, -301-323, -301-331, -301-333, -301-341, -301-342, -301-411, -301-412, -301-422, -301-512, -301-513, -301-521, -301-522, -301-525, -301-526, -301-527, -301-528, -301-529, -301-531, -301-533, -301-534, -301-536, -301-537, -301-542, -301-623, -301-624, -301-625, -301-626, -301-631, -301-632, -301-731, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-732, -301-733, -301-746, -301-764, -301-830.

Analysis:

Terracing as a reclamation method is described on page 3-75. The areas proposed to be terraced should be shown on the reclamation map. Although terracing may be appropriate in some locations it is found to be less effective than simple slope changes in many locations in Utah. Slope form or slope brakes that decrease the gradient and retain the overland flow are best technology available for erosion control. In steep sections slope faces steepened at the top and concave toward the base integrated with low angle slopes are known to be successful.

The plan states "Since a cut slope existed along portions of this area prior to mining there may not be enough material to completely eliminate the entire cut. In areas where cuts existed prior to mining, the (fill) material will be placed so as to backfill the cut to the extent possible. These areas are shown on Plates 3-2", (pg. 3-119). No such designated areas could be found on Plates 3-2, F and G and they need to be provided.

Portals will be sealed with backfill beginning at the Blind Canyon portal and backfilling the cut slope as it is excavated from down slope side. A narrow access road will be retained for

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topsoil access. Topsoil will be placed on excavated areas and then the access road will be reclaimed (3-117 to 3-118). The amendment clarifies the reclamation for the Wild Horse Ridge Blind Canyon portal is separate from the portal west of Bear Creek.

Findings:

The application does not meet the minimum regulatory requirements for this section. The permit must be updated to meet the following:

R645-301-730. 1) The areas proposed to be terraced should be shown on the reclamation map. 2) "In areas where cuts existed prior to mining, the (fill) material will be placed so as to backfill the cut to the extent possible. These areas are shown on Plates 3-2", (pg. 3-119). No such designated areas could be found on Plates 3-2, F and G and they need to be provided.

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

Analysis:

Ground-water monitoring

No additional specifics are provided regarding ground-water monitoring for the Wild Horse Ridge. The plan needs to clearly state that the operational ground-water monitoring will continue through reclamation to bond release.

Surface-water monitoring

No additional specifics are provided regarding surface-water monitoring for the Wild Horse Ridge. The plan needs to clearly state that the operational surface-water monitoring will continue through reclamation to bond release.

Acid and toxic-forming materials

See the operations section of this TA.

Transfer of wells

No discussion on transfer of wells in the new permit area is provided. It is assumed all wells will be properly abandoned when no longer needed for mining.

Discharges into an underground mine

No discharges into an underground mine are proposed for reclamation purposes.

Gravity discharges

No discussion indicating gravity discharges is expected in relation to the Wild Horse Ridge reclamation.

Water quality standards and effluent limitations

No specific information is presented indicating how water quality standards and effluent limitations will be determined prior to bond release.

Diversions

Roads to be retained in place will be re-graded to the proposed post-mining configuration and fitted with diversions. A typical cross section is in 3.6.4, pg. 3-60. To maintain the road for post-mining land use, 11 culverts will be retained. The Wild Horse Ridge Access Road is proposed for retention for post-mining land use. Conveyor Access roads No.1(lower road) and No.2 (upper road) are described in App.3-O and will be reclaimed the same as described in section 3.6.11 and 3.6.12 (3D-7A). Stream channel reclamation uses a riprapped channel design as presented in Appendix 7H. These appear to meet regulatory requirements.

Stream buffer zones

No findings on buffer zone disruption during reclamation procedures will be made by the Division until all other outstanding issues are resolved.

Sediment control measures

All re-graded and top soiled areas will be mulched or otherwise treated to retain moisture and control sediment page 4-13. Related surfaces will be ripped and scarified using a trackhoe, and include roughening to 8-12 inch deep pockets. See sedimentation ponds.

Siltation structures

See sedimentation ponds.

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Sedimentation ponds

Sediment pond 'D' is proposed to be removed during reclamation of the portal pad as described in Appendix 7-K, and Section 3.6.12, Wild Horse Reclamation Plan. The reclamation construction sequence describes the methods used during pad area reclamation to minimize sediment contributions to the drainage. These include installation of silt fences on the downstream sides of all construction areas, especially the portal pad area. After highwall removal, the road cut slope will be eliminated. A "pilot cut" will be retained to allow topsoil placement in the area. The pilot cut will then be reclaimed.

Other treatment facilities

No other treatment facilities are proposed in conjunction with the Wild Horse Ridge amendment.

Exemptions for siltation structures

No exemptions for siltation structures are requested in association with the Wild Horse Ridge amendment.

Discharge structures

No Discharge structures are proposed for retention in association with the Wild Horse Ridge amendment.

Impoundments

See sedimentation ponds.

Casing and sealing of wells

No changes are made to the existing plan in conjunction with casing and sealing of wells. It is assumed the existing plan adequately addresses this requirement.

Findings:

The application does not meet the minimum regulatory requirements for this section. The permit must be updated to meet the following:

- R645-301-731. (1)** The plan needs to clearly state that the operational ground-water monitoring will continue through reclamation to bond release. **(2)** The plan needs to clearly state that the operational surface-water monitoring will continue through reclamation to bond release.

R645-301-121.200, Several places in the submittal require typographic or other corrections to make the document readable and understandable. These include: (1) The completed, although unapproved, Stream Alteration Permit is included in an unnamed appendix behind Appendix 7-M. This appendix needs to be numbered and named. (2) A Decant Structure Detail is included on Plate 7-11, however, it's unclear which end is in the pond and which end is at the outlet of the culvert under the portal area. This should be clearly labeled with the oil skimmer end in the pond. The term "oil skimmer" is spelled incorrectly on the plate. (3) The amendment, Chapter 3, Table of Contents indicates the Wild Horse Ridge sections begin on page 111, while they actually begin on page 117. Other similar discrepancies were found, for example Tables 7.1.7 and 7.1.8 in the MRP do not fit with the amendment. The Applicant needs to check the amendment and the original MRP to make sure the amendment can be inserted and the page references in the MRP remain accurate. The review process often changes page numbers and this may require that this be the last task done. (4) The table on amendment page 7-29 needs a designation or number and a title. It should be included in the index as well. (5) Page 2-9 indicates, "Final termination date for mining operation is expected to be 2023." Page 3-80, the Reclamation Schedule, goes from 2012 to 2014. These are inconsistent and need to be resolved. (6) Catch Basin 1 is not labeled on Plate 2-4F. (7) Page 3-3, last paragraph, the term "conversion bolt" probably should be "conveyor belt." Similarly, page 3-7, last paragraph needs the word "adequate". (8) Page 3O-5, first paragraph, last sentence, needs the word "pond" added after "sediment". (9) Plate 7-1 G, the fifth area "W" (at the coal storage bin), described on page 7K-15 is not labeled on the plate. (10) Plate 7-1F has the BTCA area in the upper left corner labeled "X" and "W". One or the other needs to be eliminated. Also, culvert C-23U is shown on a ridge and needs to be moved to be shown in the stream. (11) On Plate 2-4G, culvert C34-U (unlabeled) is not in the correct location when compared to Plate 7-1G. The culvert should be in the stream and not under the road.

RECOMMENDATIONS:

The deficiencies discussed in this memorandum should be addressed prior to permit approval.